

# Description of a New Genus of Carnivorous Snail (Mollusca : Rhytididae)

BY BRIAN J. SMITH\*

## Introduction

The purpose of this paper is to erect a genus name within the family Rhytididae to accommodate a common species of snail in south-eastern Australia that is shown not to fit into any existing genus. Iredale (1933) erected the genus *Strangesta* to accommodate the large rhytidids from Queensland and northern New South Wales, with *Helix leichardti* Cox, 1864 as type species. However, uncharacteristically, he broadened his concept of the genus (Iredale 1938, 1943) to include the majority of the rhytidids of eastern Australia (18 species) from small, highly sculptured forms from southern Tasmania to the large Queensland species. Examination of a large series of eastern Australian rhytidids has revealed the existence of several generic groupings (Smith - unpublished). *Strangesta* has been redefined (Smith, 1979) and most of the other described species can be placed into existing available genera, a full revision of which will be published elsewhere (Smith - in preparation). However, because of the choice by Iredale (1933) of the type species for the genera he erected for the various generic groupings, one group is left without an available generic name. This is the group based on the earliest species name of all the Australian rhytidids, *Helix capillacea* Ferussac, 1832. Because of the similarities in radula and genital anatomy structure between this species and the New Zealand genus *Rhytida* it was tentatively placed with that genus in a recent field-guide (Smith and Kershaw, 1979). However, this placement is not satisfactory due to differences in shell and radula structure described below and a new genus is here erected for the group.

## Taxonomy

*Austrorhytida* gen. nov.

Diagnosis: Shell medium, thin, 4-5 whorls, flattened with slightly elevated spire, convex, rounded with a fairly wide umbilicus, aperture ovate-lunate. Sculpture of fine, regular, radial striae above, usually smooth below. Colour light yellow to dark honey to russet, without patterning. Radula with few lanceolate, recurved teeth grading rapidly from an almost vestigial rhacidian to a major tooth at 8 or 9, outside which are two to six vestigial laterals. Tooth 8 or 9 is over twice the length of tooth 1 and is a large, heavy tooth on a long base plate which probably articulates with the same tooth on adjacent rows. The tooth formula is approximately (2 to 6) - (8 or 9) - 1 - (8 or 9) - (2 to 6). The reproductive tract is simple with the penis, epiphallus and vagina all of approximately equal length.

Remarks: The Australian rhytidid fauna is contained in seven genera which have either been recently redescribed using anatomical as well as shell characters (Smith 1969, 1979) or will be redescribed elsewhere shortly (Smith - in preparation). These seven genera, all described by Iredale (1933) are *Victaphanta*, *Prolesophanta*, *Saladelos*, *Tasmaphena*, *Strangesta*, *Namoitena* and *Torresiropa*. Other generic names present in the literature are considered synonyms of one of these (Smith - in preparation). An eighth generic name, *Occirhenea* Iredale, 1933, should be considered *incerta sedis* as the original description is inadequate and only two shells of the single species have ever been collected (Smith, 1971). All the available species names of Australian rhytidids, except four, can be located in these seven existing genera (Smith - unpublished). These four exceptions are synonyms of one species (see below), the senior name being *Helix capillacea*

\*Honorary Associate in Invertebrate Zoology, Museum of Victoria, Melbourne.

Table 1. A comparison of the shell and radula characters of existing rhytidid genera with *Austrorhytida*.

Genera	Shell colour	Shell sculpture	Shell size	Radula type
Victaphanta	black and dark brown	smooth	large	I
Prolesophanta	light horn	smooth	v. small	II
Saladelos	yellow	v. fine	small	II
Tasmaphena	dark yellow	coarse	medium	III
Strangesta	yellow	v. fine	large	III
Namoitena	yellow	v. fine	large to medium	III
Torresiropa	pale horn	v. fine	small	unknown
Rhytida	dark yellow	irregular coarse	medium	IV
Austrorhytida	yellow	fine	medium	IV

Ferussac, 1832. Because of certain similarities between the radula structure of this species and members of the New Zealand genus *Rhytida*, the species was tentatively associated with that genus by Smith and Kershaw (1979).

The shell and radula characters of the seven existing Australian genera, the genus *Rhytida* and *Austrorhytida* are compared in Table 1. In the table, four different radula types are referred to. These are characterized as follows:-

Type I - teeth long, lanceolate with sharp points, all approximately the same size along a row with approximately 130 teeth per row.

Type II - teeth long, pointed, peg-like grading in size gradually to a series of large laterals, no one tooth dominant, approximately 50 teeth per row.

Type III - teeth long, lanceolate with sharp points, grading gradually to a dominant tooth towards the outer margin, dominant tooth only about 1.5 times the size of adjacent teeth, approximately 50 teeth per row.

Type IV - teeth long, lanceolate with sharp points, grading to a dominant tooth at about 8 to 10, dominant tooth over twice the size of adjacent teeth, approximately 32 teeth per row.

In radulae types III and IV the dominant tooth of each row may articulate with the same tooth on adjacent rows forming a line of strength down each side of the radular ribbon. The effect of this is to produce a pair of widely spaced "fangs" on every row, similar in appearance and function to the enlarged canine teeth of a mammalian carnivore. This can be called the "sabre-tooth" effect and is clearly an adaptation to the predatory habit.

Within this general pattern of a gradation of teeth to a major tooth towards the lateral margin, are a number of subsidiary patterns leading progressively towards a reduction in the number and size of both the central and marginal teeth and the dominance of the "fang" tooth. This will be described more fully elsewhere (Smith - in preparation).

Table 1 shows that only four of the genera listed appear to show similarities to *Austrorhytida*. These are *Strangesta*, *Namoitena*, *Tasmaphena* and *Rhytida*. *Strangesta* and *Namoitena* have a larger and more globose shell with much finer sculpture than *Austrorhytida*. Their radula is of type III with more teeth per row, the difference in tooth size of the larger teeth being much less and the dominant tooth is between tooth 12 and 18. In species of



Fig. 1. Dorsal, ventral and apertural views of one of the syntypes of *Helix capillacea* Ferussac, 1832 (MNHP).

these genera that have been dissected there is no epiphallus whereas *Austrorhytida* has a large epiphallus.

*Tasmaphena* has a smaller more flattened shell than *Austrorhytida* with much coarser and more irregular sculpture. Some species show colour banding on the shell, a feature not seen in *Austro-rhytida*. *Tasmaphena* has a type III radula with much less tooth graduation than seen in *Austrorhytida*, the radula formula being (18 to 24) - 1 - (18 to 24).

*Rhytida* and *Austrorhytida* both have type IV radulae with the dominant tooth in *Rhytida* being at tooth 9 or 10 while in *Austrorhytida* it is at tooth 8 or 9. The shell form and sculpture differs markedly between the two genera. *Rhytida* has very coarse, irregular sculpture giving the shell a rugose appearance and shells are usually strongly keeled. *Austrorhytida* has a shell with a rounded outline with no sign of keeling and the sculpture is of fine, regular,

transverse striae giving the shell a finely textured appearance. *Rhytida* is without an epiphallus (Climo, 1977) while *Austro-rhytida* has a prominent epiphallus.

Etymology: It is named *Austrorhytida* because of the similarity of its radula structure to that of the New Zealand *Rhytida* and because it is the only Australian genus to show this structure. Type Species: *Helix capillacea* Ferussac, 1832.

*Austrorhytida capillacea* Ferussac, 1832  
*Helix (Helicella) capillacea* Ferussac, 1821.  
*Tabl. Syst. Anim. Moll.* : 40 (nomen nudum).

*Helix capillacea* Ferussac, 1832. *Hist. nat. moll. terr. fluv.*, 27, pl. 82.

*Nanina fricta* Gould, 1852. U.S. Expl. Exped. Bost., 12: 32.

*Strangesta glaciensis* Iredale, 1938. *Aust. Zool.*, 9: 119.

*Strangesta revera* Iredale, 1943. *Aust. Zool.*, 11: 68.

Description: Shell medium, thin, with few calcareous elements, 4-5 whorls, spire flattened to slightly elevated, convex, rounded with a fairly wide umbilicus (approximately 1/3 shell diameter), aperture ovate-lunate. Sculpture of fine, regular, radial striae above and usually smooth below. Colour of the shell light yellow to dark honey, without patterning (Fig. 1). Some morphs have a greenish tinge to the shell. The animal ranges from cream to charcoal grey to greenish grey and often has a mid-dorsal line of a contrasting colour. The head is long and when actively crawling can extend nearly two shell diameters out from the shell. The shell is set back over the tail. This elongated head is to accommodate the very large buccal mass and enable the snail to insert the head into the aperture of a prey snail and is an adaptation to the carnivorous habit.

The radula consists of lanceolate, recurved teeth grading rapidly from an almost vestigial rhachidian to a major tooth at tooth 8, outside of which are about 3 almost vestigial laterals. Tooth 8 is over twice the length of tooth 1 and is very large with articulating surfaces with adjacent rows on the base-plate. Radular formula

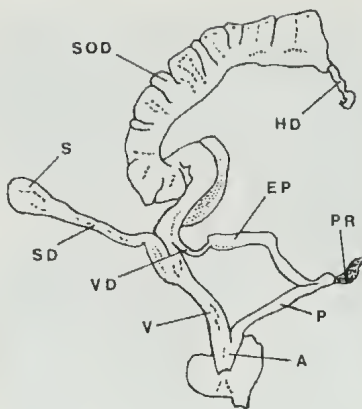


Fig. 3. Camera lucida drawing of the reproductive tract of *Austrorhytida capillacea* from Chatswood, N.S.W. (AM C101000). Abbreviations used are: A - atrium; EP - epiphallus; HD - hermaphrodite duct; P - penis; PR - penial retractor; S - spermatheca; SD - spermathecal duct; SOD - spermoviduct; V - vagina; VD - vas deferens.

3-8-1-8-3, though there appears to be some local variation (Fig. 2).

The reproductive tract is simple without talon or flagellum. The penis has very fine papillae in even rows and there is an epiphallus about equal in length with the penis and vagina. The vas deferens is very short and the spermathecal duct moderately short leading to a simple wide spermatheca (Fig. 3).

Types: *Helix capillacea* Ferussac, 1832 - 2 syntypes MNHP (no number).

*Nanina friata* Gould, 1852 - holotype USNM 5473.

*Strangesta glaciemens* Iredale, 1938 - holotype AM C55535; 2 paratypes AM C118189.

*Strangesta revera* Iredale, 1943 - type lost. (Abbrev. MNHP - Museum National d'Histoire Naturelle, Paris; USNM - United States National Museum, Washington; AM - Australian Museum, Sydney).



Fig. 2. Scanning electron microscope picture of the radula of *Austrorhytida capillacea* from Mt. Donna Buang, Victoria (NMVF5418) (x80).



Type Locality: Port Jackson, Sydney.

Distribution: Occurs from the coast and Great Divide of central New South Wales, along the Divide south through Victoria to about Mt Macedon and may occur in the Otway Ranges. Found in dry and wet forest in litter and under logs, but can be seen crawling on the surface and even on the trees in wet weather.

Remarks: This is the type species of the new genus *Austrorhytida* based on a type locality in the Sydney area. However the distribution given for the species is from central New South Wales to south western Victoria in habitats ranging from coastal dry forest and woodland to wet forest to subalpine snow-gum woodland. A more detailed examination of a large collection of individuals may reveal a number of separate species within this group. A wide variety of different colour and size morphs certainly exist but examination of the shell, anatomy and radulae of these different morphs has so far shown them to all fall within the species limits described above.

The species is an active carnivore and has been described killing and devouring a specimen of the native slug *Cystopelta petterdi* (Smith, 1980). It has also been observed feeding on the introduced snail *Helix aspersa* in Sydney gardens (P. Colman - pers. comm.).

#### Acknowledgements

I would like to thank the staff of the Department of Malacology, Museum National

d'Histoire Naturelle, Paris for loaning the types of *Helix capillacea* Ferussac, 1832 and Mr. E. Rotherham of R.M.I.T. for taking the photographs. Thanks are also due to Mr. Phil Colman of the Australian Museum for access to their collections and information about the species. I am grateful to Mr. Phil Hollis and the Electron Microscope Unit of the Department of Anatomy, University of Melbourne for use of the Scanning Electron Microscope. This work was supported by the Bureau of Flora and Fauna by funds from the Australian Biological Resources Study.

#### REFERENCES

- Climo, F. M. (1977). A higher classification of New Zealand Rhytididae (Mollusca : Pulmonata). *J. Roy. Soc. N. Z.* 7(1):59-65.
- Iredale, T. (1933). Systematic notes on Australian land shells. *Rec. Aust. Mus.* 19:37-59.
- Iredale, T. (1938). A basic list of the land Mollusca of Australia. Pt. III. *Aust. Zool.* 9:83-124.
- Iredale, T. (1943). Guide to the land shells of New South Wales. Pt. 5 *Aust. Nat.* 11:61-69.
- Smith, B. J. (1969). A comparative study of two Australian paryphantid snails, with notes on their taxonomic relationships. *Proc. Sympos. on Molluscs, India. Part 1*:164:169.
- Smith, B. J. (1971). Carnivorous snails of the family Paryphantidae. *Aust. Nat. Hist.* 17(2):55-58.
- Smith, B. J. (1979). Notes on two species of rhytidid snails from Lizard Island, North Queensland. *Rec. Aust. Mus.* 32:421-434.
- Smith, B. J. (1980). Molluscs of Lake Mountain. *Victorian Nat.* 97(2):76.
- Smith, B. J. and Kershaw, R. C. (1979). *Field guide to the non-marine molluscs of south-eastern Australia*. Canberra : ANU Press. 285 pp.